



Mosquitoes and Public Health in California

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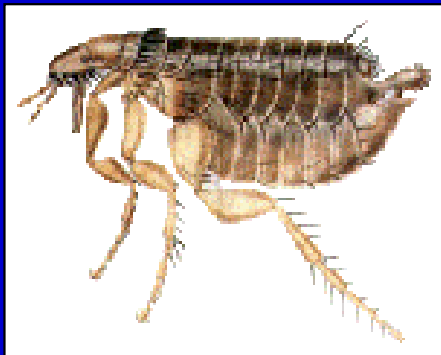
Vector-Borne Disease Section

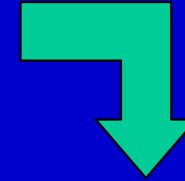
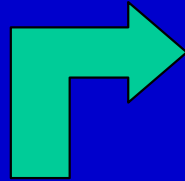
California Department of Health Services



What is a Vector ?

A vector is any insect or other animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury





Egg Raft

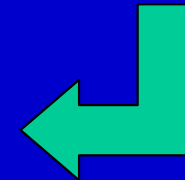
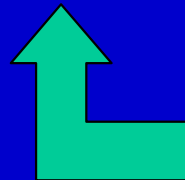


Adult

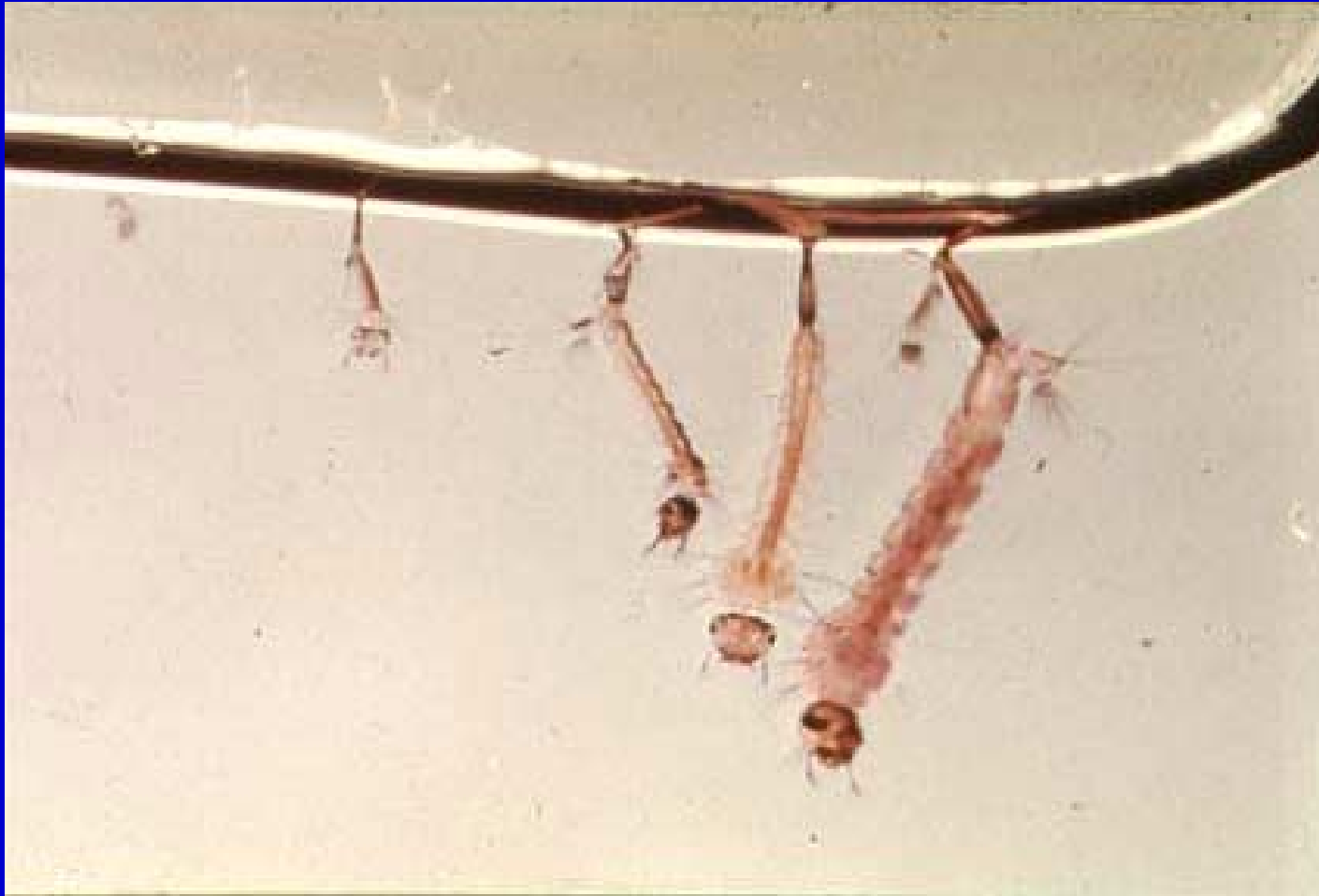
Larvae



Pupae

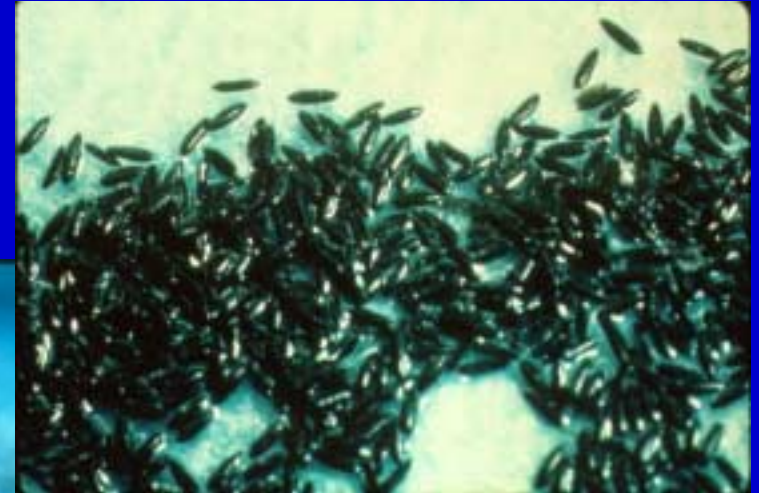


Larval Instars



California Mosquitoes

- 53 species belonging to 8 genera
- Key genera: *Culex*, *Culiseta*, *Anopheles*, and *Ochlerotatus* (*Aedes*)



Natural Sources



Agricultural Sources



Residential Sources



Community or Industrial Sources





BMPs



Mosquitoes are Pests !

- **Quality of life**
 - **Discomfort**
 - **Hypersensitivity**
- **Livestock and other animals**
- **Economic impact**
 - **Real estate values**
 - **Tourism**



Mosquito-borne diseases

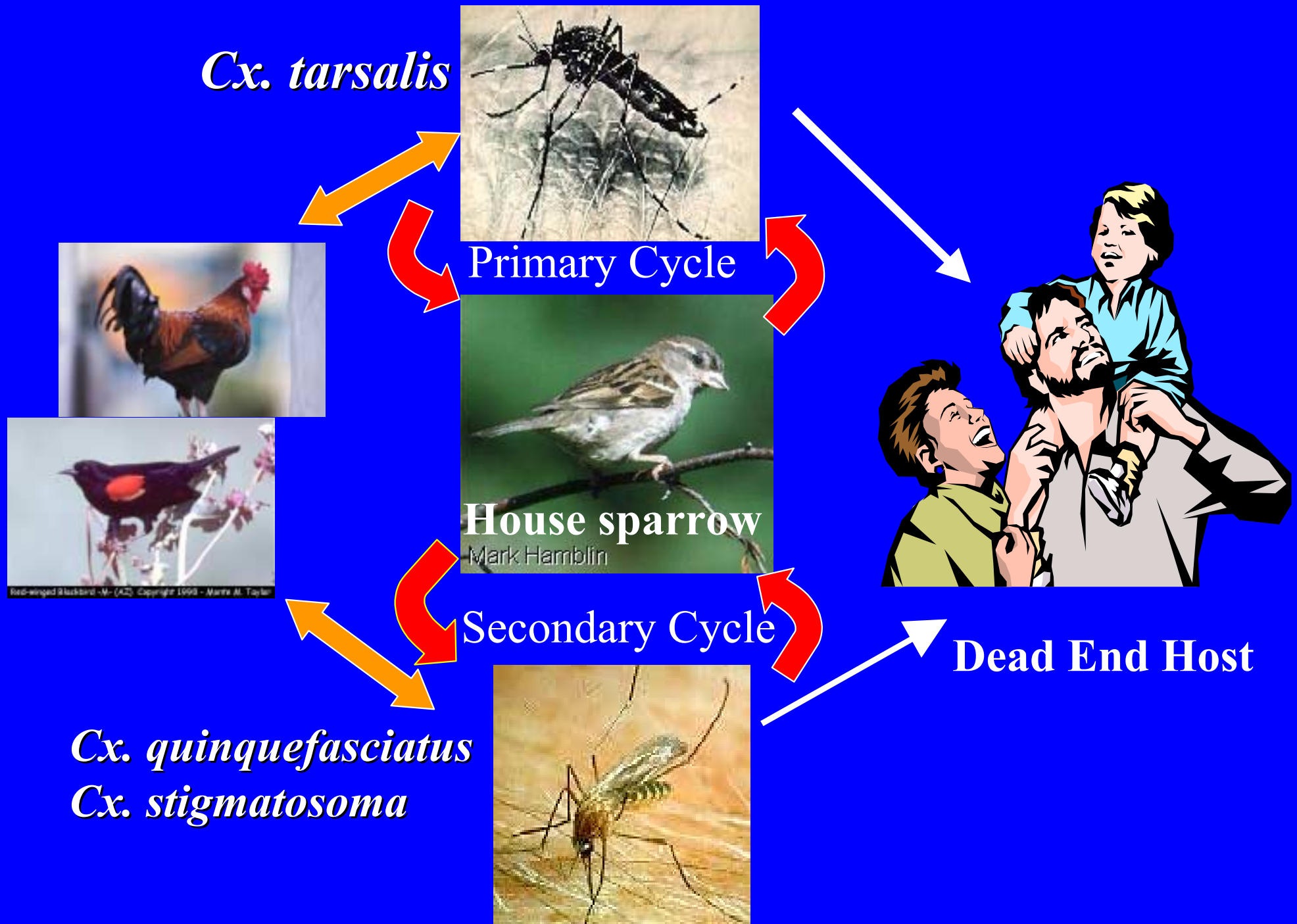


Important Diseases in California

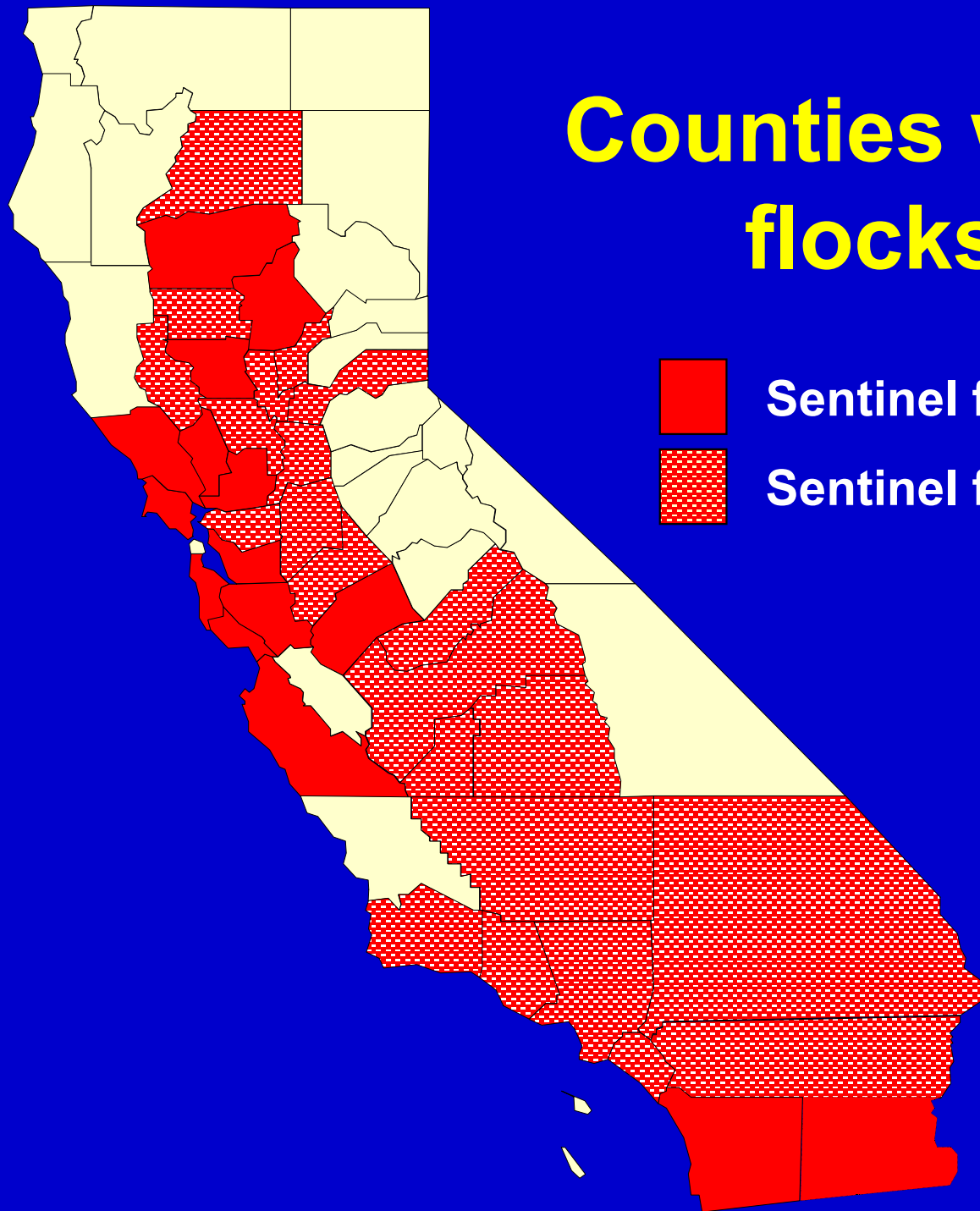
- St. Louis encephalitis (SLE)
- Western equine encephalitis (WEE)
- California encephalitis (CE)
- Malaria
- Dog heartworm





SLE Transmission Cycles



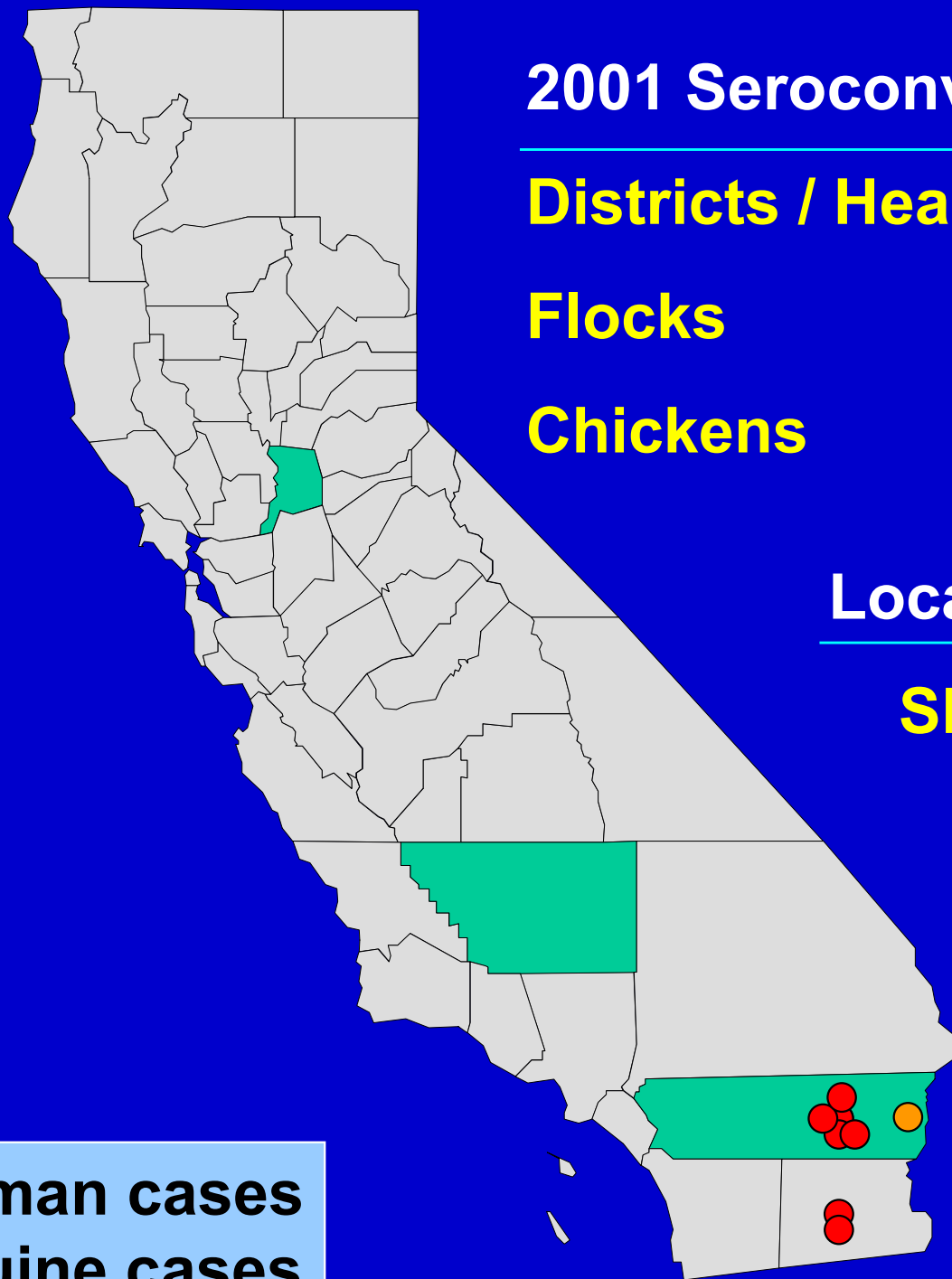
Counties with sentinel flocks in 2001



-  Sentinel flock surveillance only
-  Sentinel flocks and mosquito pools

46 agencies
191 flocks

24 agencies
mosquito pools



2001 Seroconversions

	WEE	SLE
Districts / Health Depts	1	2
Flocks	1	10
Chickens	3	62

Location of Pos. Flocks

SLE ● WEE ●

70 SLE Pos. Mosquito
Pools in Riverside Co.

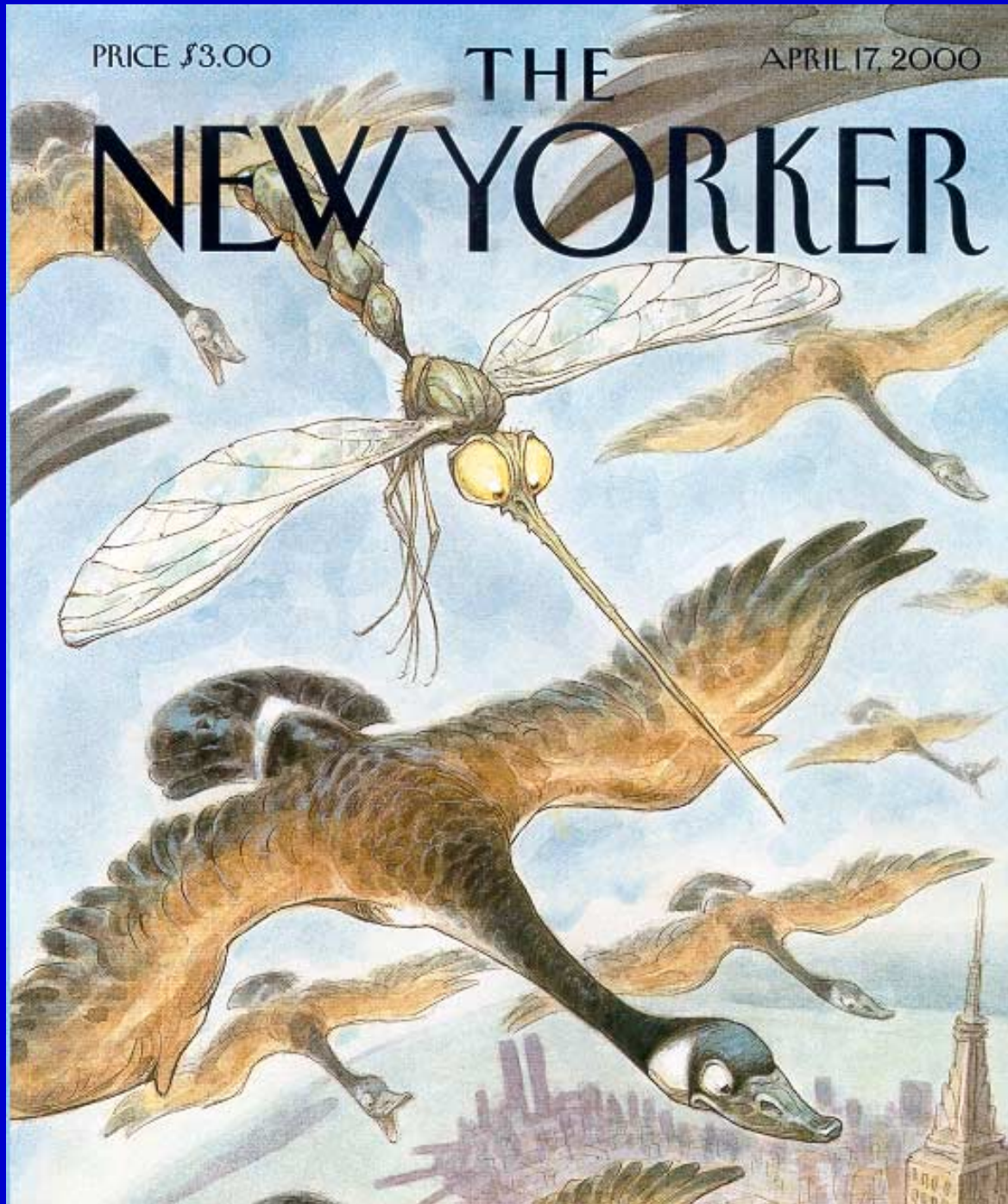
9 Bunyaviridae Pos.
Pools (8 Kern Co., 1
Sacramento Co.)

0 human cases
0 equine cases

PRICE \$3.00

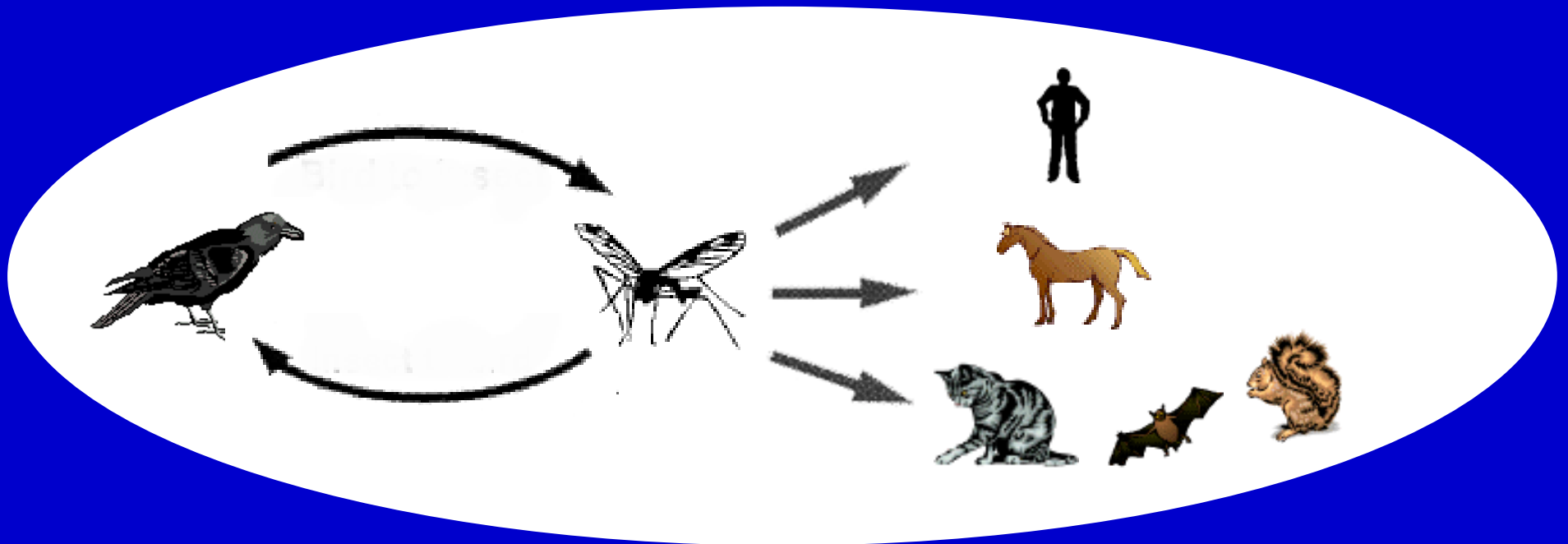
APRIL 17, 2000

THE NEW YORKER



West Nile Virus

- **RESERVOIR HOST: Birds**
- **INCIDENTAL HOSTS: Humans, horses, other mammals**



□ No detection
 First Time Detected
 ■ 1999
 ■ 2000
 ■ 2001

Spread of West Nile Virus in the United States 1999-2001

District of Columbia

Spread of West Nile Virus in the United States 1999-2001

New States Reporting WN in 2001

July

Georgia, Florida



August

Ohio, Louisiana, Michigan, Indiana,
Alabama, Wisconsin, Kentucky



September

Illinois, Mississippi, Tennessee, Iowa, Maine

October

Arkansas, Missouri

WN in Humans and Animals through November 30, 2001



Humans

49

(5 deaths)



Equines

420

(96 deaths)



Wild birds

5,710

(26 states)



Sentinel chickens

12

(FL, NYC)



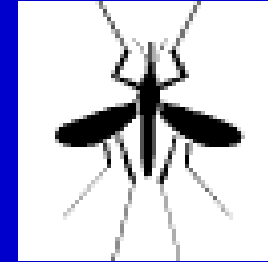
Mosquito pools

736

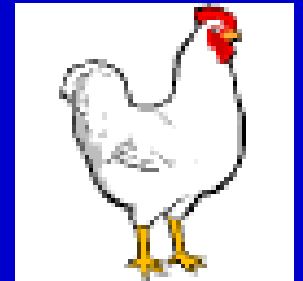
(15 states)

WN Surveillance Initiated in California in 2000

1. Mosquito Testing



2. Sentinel Chicken Testing



3. Encephalitis Case Surveillance

- Human
- Equine
- Ratite (emus and ostriches)

4. Dead Bird Testing



Asian Tiger Mosquito

Aedes albopictus

- Detected initially in June 2001 at the ports of Los Angeles & Long Beach and subsequently at certain wholesale nurseries in California



- **Day biter on humans, domestic and wild animals, and birds**
- **Vector of dengue and other diseases**



Photo: L. Munstermann

Artificial containers:
Flower pots, tin cans,
plastic buckets,
cemetery urns,
discarded tires



Natural habitats: Tree
holes, bamboo pots,
and leaf axils



- This is only the third time *Aedes albopictus* has been detected in California
- Found previously in tires in Oakland (1971) and Alameda County (late 1980s)
- Neither compare to the extent of the 2001 infestation



Aedes albopictus in California, 2001

- Imported from China and Taiwan in shipments of *Dracaena*
- Used to make the commercial product “Lucky Bamboo”



Lucky Bamboo



- **Approximately January 2000 shipments started to arrive in cargo ships**
- **The bamboo is kept alive by shipping it in 2-3 inches of water**
- **Cargo containers may hold about 500 cases with 300 plants in each case**



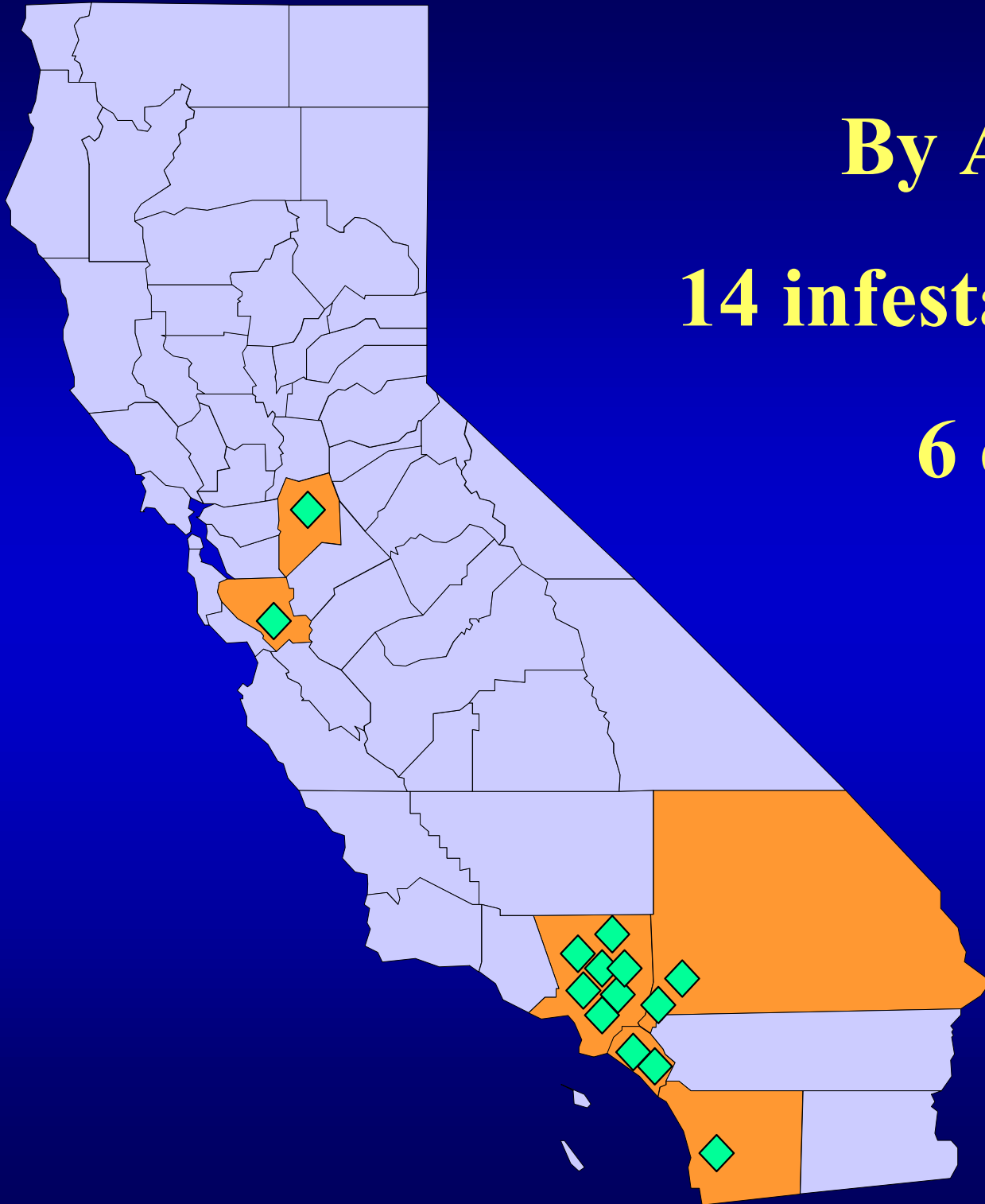
July 2: CDC declared embargo on shipments of lucky bamboo in standing water



By August 13:

14 infestations detected

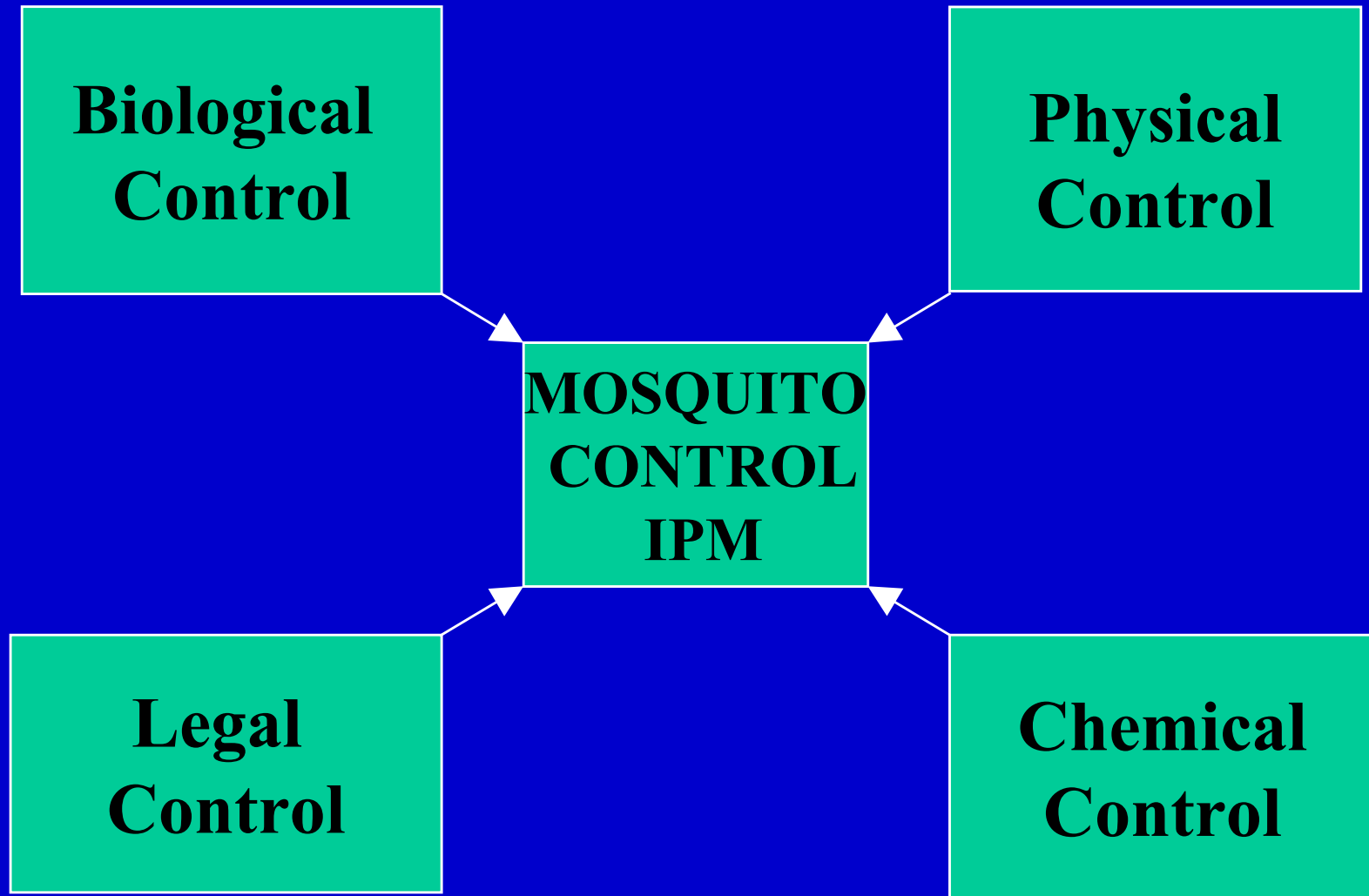
6 counties



Infestations persist in and around two nurseries in LA County



Mosquito Control: IPM Components



Health and Safety Code: State Powers



- **DHS has broad public health powers, including the power to abate public nuisances**
 - **Legislature determined that breeding places for mosquitoes and water that is a breeding place for mosquitoes are a public nuisance**
- **DHS is authorized to commence and maintain all proper and necessary actions and proceedings to abate nuisances dangerous to health**

Health and Safety Code: Local Powers

- **Local mosquito and vector control agencies, like DHS, have the authority to abate public nuisances by any remedy provided by law**
 - **Take all necessary or proper steps for the control of mosquitoes, flies, or other vectors**
 - **Abate as nuisances all standing water and other breeding places for mosquitoes**
 - **Assess civil penalties not to exceed \$500 per day for each day that a notice or hearing order to abate a nuisance has not been complied with**

What does this mean?

- Any standing water has the potential to become a source for mosquitoes or other vectors and can be considered a public nuisance
- If mosquito breeding occurs, vector control agencies are equipped with broad powers (including civil penalties) to protect public health

Local and state agencies need to work together to minimize mosquito production

- Protect public health**
- Benefit quality of life**
- Reduce costs to property owners and public agencies**
- Reduce pesticide usage**
- Ensure compliance with the Health and Safety Code**

